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strewn on a part of B. Wherever the glukase powder falls on A, dextrine is formed out of the soluble starch, and from this, under the influence of the same enzym, glucose is produced. The latter is food for the yeast and growth begins at once, but as glucose is not diffusible through the gelatine, and as dextrine is not food, the growth of the yeast is sharply limited to the spot covered by the enzym, which is but slightly diffusible and is itself not food for the yeast. On B there is at first no growth even where the glukase falls, but after a time some of the dextrine produced on A escapes from the enzym spot and, being diffusible, passes through the gelatine without influencing the imprisoned yeast cells until the glukase spot on B is reached. Here the fresh enzym immediately converts the dextrine into glucose, as shown by the production of an *S. ellipsoideus* auxanogram, the yeast spot corresponding in shape not to the area strewn with the enzym, but to so much of it as has been entered by the diffusion curve of the dextrine. This method was employed to determine what seeds contain glukase and to locate it in particular parts. The yeast is much more sensitive to minute quantities of glukase than chemical tests or polarized light. Glukase occurs in ungerminated maize principally in the horny part of the endosperm. It also occurs in abundance in the endosperm of sorghum and millet seeds, and is present in the seeds of about a dozen families of monocotyledons, i. e., in those having a mealy endosperm. Most seeds which are free from endosperm, or in which the endosperm is fleshy or horny, do not contain it. It does not occur in ungerminated wheat, rye or barley. Fresh starch grains outside the plant are attacked by glukase just as little as by diastase. Inuline also remains unchanged. The product of the action of glukase on maltose is glucose pure and simple. Dextrine is less readily converted into glucose than is maltose, and soluble starch is still less readily converted. These notes are from the third part of a long paper, Ueber Nachweis und Verbreitung der Glukase, das Enzym der Maltose, in *Centrb. f. Bakt. u. Par.*, Allg., I, 6, 7-8, and 9-10.—ERWIN F. SMITH.

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## ZOOLOGY.

### The Characters of the Enchytræid Genus *Distichopus*.—

In the absence of any information regarding the internal structure of the *Distichopus silvestris* of Leidy, European students of the Oligo-

chæta have rightly treated this species cautiously, there being no data to indicate its position in the system. That Beddard, in his recent Monograph has seemed uncertain even of the Enchytræid nature of the form, has led me to make a brief statement of its anatomical characters.

Setæ, as stated by Leidy, are restricted to the ventral series of bundles. That these are truly the ventral bundles is shown by the position of the nephrical openings at the same level, and the relation of the bundles to the lateral line. There appears to be no glandular replacements of the dorsal setæ. The complete, typical seta bundle consists of two pairs, an outer of larger and an inner of smaller setæ, disposed symmetrically. Such bundles were rarely present in the material examined, and were confined to the ante-clitellar region. In some specimens they were entirely absent. Behind the clitellum, four, or even three, setæ were seldom found, two being the rule, and on a variable number of the posterior segments only one. Often some of the segments were without setæ. This irregularity in distribution, the frequent absence of setæ on a somite, and the fact that the posterior pairs were usually the outer or larger setæ, indicate a retardation in the successive production of new pairs of setæ, and a consequent tendency toward a reduction of the number in the bundle.

In form, the setæ are peculiar, being very stout, swollen in the middle, blunt-pointed and slightly curved externally and hooked internally.

A cephalic pore is present between the prostomium and peristomial ring; but no dorsal pores were observed, though this is not conclusive evidence of their absence.

The inter-segmental septa, from the second to the sixth inclusive, are very thick and muscular, and the last three of these, namely, iv-v, v-vi, and vi-vii, bear prominent septal glands on their anterior faces. The bundles of ductules from these glands open as usual on the surface of a prominent dorsal pharyngeal pad, which was the usual structure.

The testis papillæ are united into a transverse ridge of simple columnar cells. The alimentary canal presents no marked enlargements, constrictions or saccular outgrowths. Its musculature is unusually powerful, and the two sets of fibres cross in a trellis-like arrangement, which is complicated at the septa.

The pepto-nephridia (salivary glands) are a pair of branched tubular structures in somite v, and are similar to those of several species of *Fridericia* with which they have been compared.

The ante-septal portion of the nephridia is small, and consists mainly of the funnel; the post-septal is large, with a prominent dorsal lobe,

and a slender ventral portion, from which the terminal duct arises. The intra-cellular canal is very tortuous, and in part seems to form a plexus such as has been described for other *Enchytræidæ* by Bolsius. Nuclei are prominent, but cell divisions in the granular protoplasmic mass, not apparent. No spermatheca have been found.

The essential sexual organs occupy the usual positions. The funnel of the vas deferens is rather small, with an oblique, ventrally directed mouth. Its duct is slender, closely coiled entirely within the twelfth somite, and about five or six times the length of the funnel. It terminates in a copulatory apparatus exactly like that of the *Fridericia* examined, that is, the duct perforates the muscular sheath of the spherical prostate gland, which is composed of radiating pyramidal cells, and opens immediately dorsal to the mouth of the gland into a tabular invagination of the body wall (atrium), which can be everted to serve as a penis. The oviducts have the usual form and position.

Peritoneal corpuscles are of two kinds, the smaller ones being about half the diameter of the nuclei of the large ones, elliptical and refringent.

The supra-oesophageal ganglion is truncate or slightly concave posteriorly and varies in relative length.

The dorsal blood vessel arises from the sinus in somites xiii and xiv and hence is post-clitellian. There is an internal chain of valve cells, not, however, very greatly developed. The only other peculiarity of the vascular system is in the structure of the endothelium bounding the peri-enteric blood sinus, which requires further study.

The above is an abstract of a detailed account which was prepared with appropriate figures last winter, but which has been withheld in the hope that an acquisition of fresh material would permit the elucidation of several doubtful points.

The material on which this account was based consisted of several rather poorly preserved specimens found among the collections left by the late Dr. Joseph Leidy at the University of Pennsylvania.

The several points referred to above about which I am still in doubt are the character of the spermathecæ, if present, the presence or absence of dorsal pores, the minute structure of the nephridia, and the number of species, there being indications of the existence of two. Further studies of the variations and distribution of the setæ are also desirable.

Michaelsen, in his synopsis, has placed *Distichopus* next to *Fridericia*, but apparently without any intention of suggesting relationship. That such a relationship exists, and that *Distichopus* finds its closest

ally in *Fridericia*, is perfectly evident from the above account. The form of the setæ is easily derived from the straight, internally hooked type of *Friedericia*, while their arrangement in the bundles is even more characteristically of the *Friderician* plan. The post-clitellar origin of the dorsal vessel, the colorless blood, the two kinds peritoneal corpuscles, the large size and branched arrangement (as in some species of *Fridericia*) of the salivary glands, the simple alimentary canal, the character of the male ducts and of the nephridia are all characters which these two genera possess in common. On the other hand, *Distichopus* is clearly separated *Fridericia* by the abortion of the dorsal setæ bundles, and perhaps by the absence of dorsal pores.

The absence of dorsal setæ is not to be regarded as allying *Distichopus* with *Anachaeta*.—J. PERCY MOORE.

**New Mollusca from the Pacific.**—While the *Albatross* was engaged in making soundings between the coast of California and the Hawaiian Islands in 1891–92, some dredgings were made on the archibenthal plateau about the islands in water from 300 to 400 fathoms deep, from which a small collection of molluscs and brachiopods was made. This material is now reported upon by Mr. W. H. Dall. It proves to be most interesting, and wholly new, not a single species heretofore described, either from the deep sea or from the Hawaiian Archipelago, being found among the dredgings. A new subgenus of *Pleurotomidæ*, the hitherto unknown and very interesting soft parts of a species of *Euciroa*, regarded as belonging to the *Verticordiidæ*, but now necessarily raised to family rank, and several new *Brachiopods*, are described. To these are added a few new species from the northwest American coast.

The Hawaiian collection is distributed as follows: *Gasteropoda* 11, *Scaphoda* 2, *Pelecypoda* 4. The northwest American species have been described before, but are now figured with a few additional notes, and 13 new species added to the list. (*Proceeds. U. S. Natl. Mus.* xvii, 1895.)

**Taylor on Box Turtles.**—In a classification of the Box Turtles of the United States, Mr. W. E. Taylor adopts the species recognized by Baur, and adds one new one, *Terrapene baurii*. The author agrees also with Baur as to the important position in the taxonomy of *Terrapene* of the modification of the zygomatic arch, and gives seven figures, showing that the quadratojugal is well developed in primitive forms of the genus, rudimentary in intermediant forms, and absent in *T. ornata*, the most specialized species.

In regard to distribution, the author has compiled the following facts : *T. major* is a Gulf species, and ranges from the mouth of the Rio Grande to Florida, possibly including southern Georgia. *T. baurii* belongs to the peninsula of Florida, possibly including southern Georgia. *T. carolina* is found in northeastern United States, extending from the St. Lawrence and Great Lakes south to the Carolinas and Tennessee, and west to the Mississippi River in Kentucky and to eastern Illinois. Concerning *T. mexicana* the data are insufficient to outline its range. *T. triunguis* occupies the swampy districts of the Lower Mississippi and bordering territory. *T. ornata* belongs to the plains and tablelands east of the Rocky Mts. from the Rio Grande north to the Yellowstone River. (Proc. U. S. Natl. Mus. Vol. XVII, 1895).

Although these box tortoises are similar in external appearance, they cannot be referred to a single genus owing to the extraordinary differences in the characters of the zygomatic arch which Baur has shown to be present. They furnish an illustration of a case where the generic characters are more conspicuous than the specific. Using the table furnished by Mr. Taylor, we will have the following :

#### I. Three digits to the hind foot.

|                            |                         |
|----------------------------|-------------------------|
| Zygomatic arch complete,   | <i>Pariemys</i> , g. n. |
| Zygomatic arch incomplete, | <i>Onychotria</i> Gray. |

#### II. Four digits to the hind foot.

|                            |                        |
|----------------------------|------------------------|
| Zygomatic arch complete,   | <i>Toxapsis</i> g. n.  |
| Zygomatic arch incomplete, | <i>Terrapene</i> Merr. |

The only species of *Pariemys* is *P. baurii* Taylor. Of *Onychotria* there are two species, *O. triunguis* and *O. mexicana*. Of *Toxapsis* but one species is known, viz., *T. major* ; while there are two of *Terrapene*, viz., *T. carolina* and *T. ornata*.—E. D. COPE.

**The Genera of Xantusiidæ.**—The interesting additions to this family of lizards made by Stejneger and Van Denburgh exhibit a large range of variation in scutellation of the head. It appears to me that neither of the species added by these gentlemen can be properly referred to *Xantusia*, and I would distinguish them as the types of two genera. The genera of Xantusiidæ appear to me to be five, distinguished as follows :

## I. One frontal and frontonasal plates.

Superciliary scales, none ; pupil round, *Lepidophyma* Dum.  
 Superciliary scales present ; pupil erect, *Xantusia* Bd.

## II. One frontal and two frontonasal plates, pupil erect.

An interoccipital plate ; frontoparietals in contact ; superciliaries,  
*Zablepsis* Cope.  
 No interoccipital ; frontoparietals widely separated ; superciliaries,  
*Cricosaura* Pet.

## III. Two frontals and one frontonasal ; pupil erect.

No interoccipital ; frontoparietals in contact ; superciliaries,  
*Amæbopsis* Cope.

Each genus includes but one species except *Xantusia*, which has two. The type of *Zablepsis* is the *Xantusia henshavi* Stejneger, and the type of *Amæbopsis* is *X. gilbertii* Van Denburgh. The former is from Southern, the latter from Lower California.—E. D. COPE.

**Occurrence of the Siberian Lemning-Vole (*Lagurus*) in the United States.**—In describing a new vole (*Arvicola pallidus*) from Dakota, in 1888,<sup>1</sup> I referred it to the subgenus *Chilotus* of Baird, with which it agrees in the number of triangles in the molar teeth. Two years later, when studying a collection of voles from Idaho, I found that *pallidus* and its near ally *pauperrimus*, differed from *Chilotus* in important cranial and external characters, and the teeth, while agreeing in the number of triangles, differed materially in other respects. They were, therefore, removed from *Chilotus*,<sup>2</sup> but a new subgenus was not erected for them because it was believed that they would be found to fit into some of the numerous named groups of Eurasian voles of which no specimens were then available for comparison. Through the courtesy of Mr. Gerrit S. Miller, Jr., I now have before me a skin and skull of the Siberian *Lagurus lagurus* (Pallas) [= *Eremiomys lagurus* Auct.<sup>3</sup>], collected at Gurjew on the north shore of the Caspian Sea, and recently received by him from

<sup>1</sup> AMERICAN NATURALIST, August, 1888, 702-705.

<sup>2</sup> N. Am. Fauna, No. 5, August, 1891, 64-65.

<sup>3</sup> The generic name, *Lagurus*, of Gloger (1841), antedates *Eremiomys* Poliokoff (1881) by forty years. For an article on Gloger's names see Thomas, in Annals and Magazine Nat. Hist., Ser. 6, Vol. XV, 1895, pp. 189-193.

the St. Petersburg Museum. At first glance I was impressed by the strong resemblance of this animal to our members of the *pallidus* group; and a detailed comparison of the skulls, teeth, and external characters of the two serves only to confirm this view. They agree in the small flattened skull with squarish, depressed braincase and short nasals; the pattern of the molar teeth (not only the number and relations of the triangles, but also the distant spacing of the loops posteriorly and the appearance of immaturity of the posterior molar in both jaws); the structure of the hinder part of the palate; the short wooly hind feet; the short tail; and even the softness of the pelage and pale coloration. In Mr. Miller's specimen the audital bullæ and occipital region are broken off, but on comparing these parts in the American members of the *pallidus* group with Buchner's figures of *Eremiomys* [= *Lagurus*] *lagurus*<sup>4</sup>, they are found to be essentially identical. The posterior part of the braincase is not only flattened, depressed and very broad, but the audital and mastoid bullæ are unusually large and the latter project decidedly behind the plane of the occiput. From the close agreement in the above mentioned essential characters, and the absence of important differences, I unhesitatingly refer the American *Microtines* described under the names *Arvicola curtatus*, *pauperrimus* and *pallidus*, to the Eurasian *Lagurus*. The principal differences are that *L. lagurus* has the tail even shorter than our species, and the ear decidedly smaller. There is also a more or less clearly defined dark streak down the middle of the back that is not present in the American forms.

*Lagurus* is commonly accorded full generic rank, but I am unable to appreciate more than subgeneric weight in the characters that distinguish it from *Microtus*. Why it has been called a lemming instead of a vole I am not able to understand.

It is gratifying to add another group to the *Microtines* of Circumpolar distribution and at the same time lessen the number restricted to a single continent. *Lagurus* is a Boreal group, finding its southern limit in the Transition Zone.—C. HART MERRIAM.

**The Introitus Vaginæ of certain Muridæ.**—A series of observations made by Mr. G. I. Miller, during the winter and spring months of 1890 and 1891, prove conclusively that in many of the smaller American Muridæ and also in the European *Mus sylvaticus*, *Eutamias glareolus* and *Microtus agrestis* the vaginal orifice, during pregnancy, lactation and the period of sexual inactivity, is tightly

<sup>4</sup> Przewalski's Reise nach Central-Asien, Säugethiere, liefr. 3, 1889, pl. XIII.



closed by a membrane which resembles a hymen. That this structure is not homologous with the hymen the author has discovered by a histological examination. A series of sections shows conclusively that the vaginal orifice is closed, not, as Lataste states, by the mere approximation of the walls, but by a mass of epidermal cells which is absolutely continuous across the vaginal region. This peculiar epithelial growth does not contain the same histological elements, nor does it occupy the same position as the hymen.

The use of the structure is to protect the vagina from particles of dust, dirt and sand, and probably originated, according to the author, as the result of the action of foreign substances in the vaginal orifice, since mechanical irritation of epithelial tissue causes cell proliferation. This tendency to cell growth in a definite region once established, the protection afforded by it, although incomplete, might offer sufficient opportunity for the operation of natural selection, whereby the definite and useful structure now present could be perfected. (Proceeds. Boston Nat. Hist. Soc., XXVI, 1895).

**Zoological News.**—A note published by M. A. T. Rochebrune calls attention to a mollusc with toxic properties. This mollusk is *Spondylus americanus*, found by M. Diguët in Lower California. It emits an odor of sulphuretted hydrogen, strong enough to disgust even a famished creature, so it is never prayed upon for food. M. de Rochebrune has isolated the toxic principle by the Stass method, and has obtained an unctuous olive-green extract with an acrid odor and bitter taste, which produces a burning sensation, and which burns with a vivid yellow flame. .001 gr. kills a frog in 12 minutes, after first producing paralysis. .003 gr. kills a guinea pig in 25 minutes. Chemical reactions indicate that in *Spondylus americanus* there is elaborated a product allied to ptomaines and leucomaines, very similar to muscarine, the toxic product of the mushroom, *Amanita muscaria*, and which M. Rochebrune calls Spondylotoxine. (Revue Scientifique, June, 1895).

The South American Characinidæ collected by C. F. Hart, and presented to Cornell University, comprises 167 species of which seven are new, four of them belonging to the genus *Tetragonopterus*. The material has been identified by A. B. Ulrey. (Am. N. Y. Acad. Sci. 1895).

A collection of birds made in the Philippine Islands by the Menage Expedition for the Minnesota Academy of Natural Sciences includes 36 new species. These are described by Messrs. Bourns and Worces-

ter (1804) in the first volume of Occasional Papers issued by that institution. Two hundred and twenty-six species are noted as already described, but from localities not previously known. Of these 73 were found in the Calamianes Islands—all of them identical with species found in Palawan.

M. A. Pettit, having had an opportunity of examining the suprarenal capsules of two adult *Ornithorhyncus* (*O. paradoxus*) makes the following statements in regard to them. In size and general appearance the suprarenal capsules of *Ornithorhyncus* resemble those of mammals, while their position, within the posterior extremity of the kidney, is an Avian character. (Bull. Soc. Zool. de France, T. XIX, 1894).

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## ENTOMOLOGY.<sup>1</sup>

**A new *Tettix*.**—In a series of specimens of Tettigidæ received from Mr. J. C. Warren of Palouse, Washington, I find a new form, see Fig. 1, nearly allied to *Tettix granulatus* but having certain recognizable differences as here described.

*Tettix incurvatus* sp. nov. Resembling *Tettix granulatus* nearly but differing as follows: Average length shorter, more robust, pronotum faintly bulging and deeper over the thorax, lateral angles more pronounced, median carina of pronotum distinctly elevated reaching the maximal height over the shoulders, a small swollen space here intercepting the base leaves the carina just in front sharply compressed, convexly sloping to the front, with a depression on each side—this is barely indicated in *T. granulatus*. Dorsal front and lateral front margin of pronotum encroaching on the head. Face broader, cheeks more swollen. Surface of pronotum densely granulated interspersed with fewer coarse granulations. Color dark brownish fuscous tending to black. In the male the wings slightly over reach the pronotum from  $\frac{1}{2}$  to 1 mm.; in the female this condition varies, the wings slightly over reaching the pronotum in some cases, in other individuals the reverse is true. Specimens of *T. granulatus* from Indiana, Illinois and

<sup>1</sup> Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.